



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,470	12/12/2006	Trygve Burchardt	095868-1017	1168

26371 7590 03/09/2012
FOLEY & LARDNER LLP
777 EAST WISCONSIN AVENUE
MILWAUKEE, WI 53202-5306

EXAMINER

DOUYETTE, KENNETH J

ART UNIT	PAPER NUMBER
----------	--------------

1725

MAIL DATE	DELIVERY MODE
-----------	---------------

03/09/2012

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/595,470	Applicant(s) BURCHARDT, TRYGVE	
	Examiner KENNETH DOUYETTE	Art Unit 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2012.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 38-46 and 48-85 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 38-46 and 48-85 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Amendment

1. Claims 38-46 and 48-85 are pending in the application.
2. Previous grounds of rejection have been maintained.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 38, 40-44, 48-53, 55, 59-60 and 82-85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Dansui et al. (US 6,033,805) and further in view of Ovshinsky et al. (US 2002/0064709).

Regarding claim 38, Klein et al. discloses in Fig 1, an electrode ([0042]) for use in an electrochemical cell (ref 1) comprising:

- a first sheet (ref 2) comprising a hydrogen storage material ([0043]); and
- a second sheet (ref 7) separate (Fig 1) from the first sheet (ref 2), the second sheet (ref 7) comprising a high energy density metal ([0049]) that is configured to act as a hydrogen source (refs 2 and 7 are in contact with one another, Fig 1) for the hydrogen storage material ([0043]) on reaction with electrolyte ([0047]) in the cell (ref 1). Additionally, if a prior art structure is capable of performing the intended use as recited in the preamble, then it meets the claim. See, e.g., *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

Klein et al. does not disclose the high energy density metal is mixed with PTFE or graphite.

Dansui et al. discloses a battery comprising an electrode formed of a high energy density metal (C11/L24) with PTFE mixed in (C11/L30-31). This configuration enhances adhering of the material containing the high energy density metal to a current collector and enhances the capacity of the battery (C11/L32-40).

Dansui et al. and Klein et al. are analogous since both deal in the same field of endeavor, namely, batteries.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the PTFE mixed with a high energy density metal disclosed by Dansui et al. into the second sheet of Klein et al. to enhance the structure of the electrode and enhance overall battery capacity and performance.

Klein et al. also does not disclose an electrocatalyst.

Ovshinsky et al. discloses an electrode for an electrochemical cell (Abstract) including a hydrogen storage alloy and a hydride additive that precharges the hydrogen storage material ([0035]) and enhances the activation reactivity of the electrode ([0089]), enhancing overall performance.

Ovshinsky et al. and Klein et al. are analogous since both deal in the same field of endeavor, namely, electrode materials.

Art Unit: 1725

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen additive disclosed by Ovshinsky et al. into the electrode material mix of Klein et al. to precharge the hydrogen storage material and enhances the activation reactivity of the electrode, enhancing overall performance.

Regarding claims 40 and 41, Klein et al. discloses all of the claim limitations as set forth above but does not disclose the high energy density metal is mixed with PTFE and/or graphite.

Dansui et al. discloses a battery comprising an electrode formed of a high energy density metal (C11/L24) with a carbonaceous material (C11/L30) and PTFE mixed in (C11/L30-31). This configuration enhances adhering of the material containing the high energy density metal to a current collector and enhances the capacity of the battery (C11/L32-40).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the carbonaceous material and PTFE mixed with a high energy density metal disclosed by Dansui et al. into the second sheet of Klein et al. to enhance the structure of the electrode and enhance overall battery capacity and performance.

Regarding claim 42, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the hydrogen storage material is an alloy consisting of rare earth/mich alloys ([0043]).

Regarding claim 43, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the first sheet (ref 2) comprises PTFE mixed ([0066]) with the hydrogen storage material ([0043]).

Regarding claim 44, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the first sheet (ref 2) comprises carbon mixed ([0043]) with the hydrogen storage material ([0043]).

Regarding claims 48, 49, 50, Klein et al. discloses all of the claim limitations as set forth above but does not disclose a Ni alloy hydrogen electrocatalyst in powder form deposited on a carbon substrate.

Ovshinsky et al. discloses an electrode for an electrochemical cell (Abstract) including a hydrogen storage alloy and a hydride additive powder material comprising Ni alloy ([0036]) on a carbon support ([0060]) that precharges the hydrogen storage material ([0035]) and enhances the activation reactivity of the electrode ([0089]), enhancing overall performance.

Ovshinsky et al. and Klein et al. are analogous since both deal in the same field of endeavor, namely, electrode materials.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen additive discloses by Ovshinsky et al. into the electrode material mix of Klein et al. to precharge the hydrogen storage material and enhances the activation reactivity of the electrode, enhancing overall performance.

Regarding claim 51-52, Klein et al. discloses all of the claim limitations as set forth above and also discloses two distinct sheets (ref 2, 7), but does not disclose a hydrogen electrocatalyst disposed in either sheet.

Ovshinsky et al. discloses an electrode for an electrochemical cell (Abstract) including a hydrogen storage alloy and a hydride additive that precharges the hydrogen storage material ([0035]) and enhances the activation reactivity of the electrode ([0089]), enhancing overall performance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen additive discloses by Ovshinsky et al. into the electrode material mix of Klein et al. to precharge the hydrogen storage material and enhances the activation reactivity of the electrode, enhancing overall performance. Further, since the instant specification is silent to unexpected result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the hydride additive of Ovshinsky et al. in either layer of Klein, because selecting one of known designs for a layered electrode would have been considered obvious to one of ordinary skill in the art at the time of the invention and because said electrode containing hydride material in either layer equally well as the one disclosed by modified Klein et al. Further still, since it has been held that rearranging parts of an invention involves only routine skill in the art while the device having the claimed dimensions would not perform differently than the prior art device, *In re Japikse*, 86

Art Unit: 1725

USPQ 70 and since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art, *In re Einstein*, 8 USPQ 167.

Regarding claim 53, Klein et al. discloses all of the claim limitations as set forth above and also discloses layers (refs 2 and 7), as well as ref 7 comprising “several layers” ([0049]), but not an additional, separate layer that contains the hydrogen electrocatalyst.

Ovshinsky et al. discloses an electrode for an electrochemical cell (Abstract) including a hydrogen storage alloy and a hydride additive that precharges the hydrogen storage material ([0035]) and enhances the activation reactivity of the electrode ([0089]), enhancing overall performance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen additive discloses by Ovshinsky et al. into the electrode material mix of Klein et al. to precharge the hydrogen storage material and enhances the activation reactivity of the electrode, enhancing overall performance. Further, since the instant specification is silent to unexpected result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange a hydrogen electrocatalyst as a separate layer unto itself as taught by Ovshinsky et al. into the structure of Klein et al., because selecting one of known designs for a layered electrode structure would have been considered obvious to one of ordinary skill in the art at the time of the invention and because said layered electrode

Art Unit: 1725

defining a separate and distinct layer containing hydrogen electrocatalyst would operate equally well as the one disclosed by Klein et al.

Regarding claim 55, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses a current collector ([0045]) pressed into the first sheet (ref 2).

Regarding claim 59, Klein et al. disclose all of the claim limitations as set forth above but does not disclose the high energy density material is configured to act as an anode. Ovshinsky discloses a fuel cell ([0318]) containing an anode ([0356]). Since the instant specification is silent to unexpected result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange a metal layer of Klein et al. to have act as an anode, as taught by Ovshinsky et al., because selecting one of known designs for an electrochemical cell would have been considered obvious to one of ordinary skill in the art at the time of the invention and because said electrochemical cell defining a metal layer as an anode would operate equally well as the one disclosed by Klein et al.

Regarding claim 60, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the high energy density metal ([0049]) is configured to prevent corrosion (refs 2 and 7 are in contact with one another, Fig 1) of the electrode ([0042]). Additionally, if a prior art structure is capable of performing the intended use

Art Unit: 1725

as recited, then it meets the claim. See, e.g., *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

Regarding claims 82-83, Klein et al. discloses in Fig 1, a method of producing an electrode ([0042]) for an electrochemical cell (ref 1), the electrode ([0042]) comprising a hydrogen storage alloy ([0043]) and a high energy density metal ([0049]), the method comprising:

- forming a first sheet (ref 7) of a high energy density metal ([0049]), the energy density metal ([0047]) being configured to act as a hydrogen source (metal at [0049] is sealed with electrodes and electrolyte [0025],[0053]) for the hydrogen storage alloy on reaction with electrolyte ([0047]) in the cell (when Al contacts an alkaline electrolyte, hydrogen is evolved as evidenced by Bernard et al., “Understanding aluminum behavior in aqueous alkaline solution using coupled techniques: Part I. Rotating ring-disk study” and further evidenced by Tang et al., “The effect of zinc on the aluminum anode of the aluminum-air battery”);
- forming a second sheet (ref 2) comprising a hydrogen storage alloy ([0043]); and
- pressing ([0048]-[0049]) the first (ref 7) and second (ref 2) sheets together to form the electrode ([0042]).

Klein et al. does not disclose sintering with a binder (PTFE) the first sheet.

Dansui et al. discloses a battery comprising an electrode formed of a high energy density metal (C11/L24) with PTFE mixed in (C11/L30-31). This configuration

Art Unit: 1725

enhances adhering of the material containing the high energy density metal to a current collector and enhances the capacity of the battery (C11/L32-40).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the PTFE mixed with a high energy density metal disclosed by Dansui et al. into the second sheet of Klein et al. to enhance the structure of the electrode and enhance overall battery capacity and performance.

Klein et al. also does not disclose an electrocatalyst.

Ovshinsky et al. discloses an electrode for an electrochemical cell (Abstract) including a hydrogen storage alloy and a hydride additive that precharges the hydrogen storage material ([0035]) and enhances the activation reactivity of the electrode ([0089]), enhancing overall performance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen additive discloses by Ovshinsky et al. into the electrode material mix of Klein et al. to precharge the hydrogen storage material and enhances the activation reactivity of the electrode, enhancing overall performance.

Regarding claim 84, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses forming a third sheet ("several layers") ([0049]), combined together ([0049]) with the layers (refs 2, 7), but does not disclose an electrocatalyst added to a third sheet.

Art Unit: 1725

Ovshinsky et al. discloses an electrode for an electrochemical cell (Abstract) including a hydrogen storage alloy and a hydride additive that precharges the hydrogen storage material ([0035]) and enhances the activation reactivity of the electrode ([0089]), enhancing overall performance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen additive discloses by Ovshinsky et al. into the electrode material mix of Klein et al. to precharge the hydrogen storage material and enhances the activation reactivity of the electrode, enhancing overall performance.

Regarding claim 85, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses pressing a current collector ([0045]) into the second sheet (ref 2).

5. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Dansui et al. (US 6,033,805) and Ovshinsky et al. (US 2002/0064709) as applied to claim 38 above and further in view of Sapru et al. (US 6,616,891).

Regarding claim 39, modified Klein et al. discloses all of the claim limitations as set forth above but does not disclose the high energy density material comprises Zn, Mg, Fe or alloys thereof.

Sapru et al. discloses an electrode for an electrochemical cell (C1/L18-19) including a hydrogen storage alloy (Abstract) and Zn and Fe (C3/L44-C4/L1-2), which enhances

Art Unit: 1725

hydrogen storing capability, resulting in enhanced performance at lower relative temperatures (C3/L20-25).

Sapru et al. and Klein et al. are analogous since both deal in the same field of endeavor, namely, hydrogen storage materials for electrochemical cells.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the Zn and Fe materials disclosed by Sapru et al. into the electrode material of Klein et al. to enhance hydrogen storage capability, enhancing overall performance at lower temperatures.

6. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Dansui et al. (US 6,033,805) and Ovshinsky et al. (US 2002/0064709) as applied to claim 38 above and further in view of Bando et al. (US 5,965,295).

Regarding claim 54, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses current collectors ([0045]), but does not explicitly disclose the current collectors are mesh.

Bando et al. discloses a mesh current collector (Fig 2) is pressed into the active materials (C12/L8-13). This configuration enhances active material adhesion to current collectors, enhancing tensile strength (C2/L40-41) of the structure.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the current collector of Klein et al. as mesh as disclosed by

Art Unit: 1725

Bando et al. to enhance adhesion of active materials to the current collector, enhancing tensile strength of the structure.

7. Claims 61-62, 64-65, 67-72 and 75-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Ovshinsky et al. (US 2002/0064709).

Regarding claim 61, Klein et al. discloses in Fig 1, an electrode ([0042]) for use in an electrochemical cell (ref 1) comprising:

- a first sheet (ref 2) comprising a hydrogen storage material ([0043]); and
- a second sheet (ref 7) separate (Fig 1) from the first sheet (ref 2), the second sheet (ref 7) comprising a high energy density metal ([0049]) that is configured to act as a hydrogen source (refs 2 and 7 are in contact with one another, Fig 1) for the hydrogen storage material ([0043]) on reaction with electrolyte ([0047]) in the cell (ref 1). Additionally, if a prior art structure is capable of performing the intended use as recited in the preamble, then it meets the claim. See, e.g., *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

Klein et al. does not disclose an electrocatalyst.

Ovshinsky et al. discloses an electrode for an electrochemical cell (Abstract) including a hydrogen storage alloy and a hydride additive that precharges the hydrogen storage material ([0035]) and enhances the activation reactivity of the electrode ([0089]), enhancing overall performance.

Art Unit: 1725

Ovshinsky et al. and Klein et al. are analogous since both deal in the same field of endeavor, namely, electrode materials.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen additive discloses by Ovshinsky et al. into the electrode material mix of Klein et al. to precharge the hydrogen storage material and enhances the activation reactivity of the electrode, enhancing overall performance.

Regarding claim 62, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the high energy density metal comprises Al and such alloys ([0047]).

Regarding claim 64, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the hydrogen storage material is an alloy consisting of rare earth/mich alloys ([0043]).

Regarding claim 65, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the first sheet (ref 2) comprises PTFE mixed ([0066]) with the hydrogen storage material ([0043]).

Regarding claim 67, Klein et al. discloses all of the claim limitations as set forth above but does not disclose a Ni alloy hydrogen electrocatalyst.

Art Unit: 1725

Ovshinsky et al. discloses an electrode for an electrochemical cell (Abstract) including a hydrogen storage alloy and a hydride additive powder material comprising Ni alloy that precharges the hydrogen storage material ([0035]) and enhances the activation reactivity of the electrode ([0089]), enhancing overall performance.

Ovshinsky et al. and Klein et al. are analogous since both deal in the same field of endeavor, namely, electrode materials.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen additive discloses by Ovshinsky et al. into the electrode material mix of Klein et al. to precharge the hydrogen storage material and enhances the activation reactivity of the electrode, enhancing overall performance.

Regarding claim 68-69, Klein et al. discloses all of the claim limitations as set forth above and also discloses two distinct sheets (ref 2, 7), but does not disclose a hydrogen electrocatalyst disposed in either sheet.

Ovshinsky et al. discloses an electrode for an electrochemical cell (Abstract) including a hydrogen storage alloy and a hydride additive that precharges the hydrogen storage material ([0035]) and enhances the activation reactivity of the electrode ([0089]), enhancing overall performance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen additive discloses by Ovshinsky et al. into the electrode material mix of Klein et al. to precharge the hydrogen storage material and enhances the activation reactivity of the electrode, enhancing overall performance.

Art Unit: 1725

Further, since the instant specification is silent to unexpected result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the hydride additive of Ovshinsky et al. in either layer of Klein, because selecting one of known designs for a layered electrode would have been considered obvious to one of ordinary skill in the art at the time of the invention and because said electrode containing hydride material in either layer equally well as the one disclosed by modified Klein et al. Further still, since it has been held that rearranging parts of an invention involves only routine skill in the art while the device having the claimed dimensions would not perform differently than the prior art device, *In re Japikse*, 86 USPQ 70 and since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art, *In re Einstein*, 8 USPQ 167.

Regarding claim 70, Klein et al. discloses all of the claim limitations as set forth above and also discloses layers (refs 2 and 7), as well as ref 7 comprising "several layers" ([0049]), but not an additional, separate layer that contains the hydrogen electrocatalyst.

Ovshinsky et al. discloses an electrode for an electrochemical cell (Abstract) including a hydrogen storage alloy and a hydride additive that precharges the hydrogen storage material ([0035]) and enhances the activation reactivity of the electrode ([0089]), enhancing overall performance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen additive disclosed by Ovshinsky et al. into the

Art Unit: 1725

electrode material mix of Klein et al. to precharge the hydrogen storage material and enhances the activation reactivity of the electrode, enhancing overall performance. Further, since the instant specification is silent to unexpected result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange a hydrogen electrocatalyst as a separate layer unto itself as taught by Ovshinsky et al. into the structure of Klein et al., because selecting one of known designs for a layered electrode structure would have been considered obvious to one of ordinary skill in the art at the time of the invention and because said layered electrode defining a separate and distinct layer containing hydrogen electrocatalyst would operate equally well as the one disclosed by Klein et al.

Regarding claims 71-72, Klein et al. discloses all of the claim limitations as set forth above and also discloses current collectors ([0045]) in the electrode material sheet (ref 2).

Regarding claim 75, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the electrochemical cell (ref 1) is a metal hydride cell ([0043]).

Regarding claim 76, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the electrochemical cell (ref 1) is a nickel ([0044]) metal hydride cell ([0043]).

Regarding claim 77, Klein et al. discloses all of the claim limitations as set forth above but does not explicitly disclose the electrochemical cell is a fuel cell.

Ovshinsky et al. discloses a fuel cell (Abstract) containing electrodes containing hydrogen storage materials (Abstract). Since the instant specification is silent to unexpected result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange an electrochemical cell of Klein et al. to be a fuel cell, as taught by Ovshinsky et al., because selecting one of known designs for an electrochemical cell would have been considered obvious to one of ordinary skill in the art at the time of the invention and because said electrochemical cell comprising a fuel cell would operate equally well as the one disclosed by Klein et al.

Regarding claim 78, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the electrode ([0042]) is a negative electrode ([0042]).

Regarding claims 79, 80 and 81, modified Klein et al. discloses all of the claim limitations as set forth above and also discloses the high energy density metal is configured to provide self-charging (refs 2 and 7 contact one another, Fig 1, [0047]-[0048]) for the electrochemical cell (ref 1) and provide increase capacity (refs 2 and 7 contact one another, Fig 1, [0048]-[0049]) for the electrochemical cell (ref 1) and to provide increased peak power (refs 2 and 7 contact one another, Fig 1, [0047]-[0048]) for the electrochemical cell (Fig 1). Additionally, if a prior art structure is capable of

Art Unit: 1725

performing the intended use as recited, then it meets the claim. See, e.g., *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

8. Claim 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Ovshinsky et al. (US 2002/0064709) as applied to claim 61 above and further in view of Dansui et al. (US 6,033,805).

Regarding claim 63, modified Klein et al. discloses all of the claim limitations as set forth above but does not disclose the high energy density metal is mixed with PTFE and/or graphite.

Dansui et al. discloses a battery comprising an electrode formed of a high energy density metal (C11/L24) with a carbonaceous material (C11/L30) and PTFE mixed in (C11/L30-31). This configuration enhances adhering of the material containing the high energy density metal to a current collector and enhances the capacity of the battery (C11/L32-40).

Dansui et al. and Klein et al. are analogous since both deal in the same field of endeavor, namely, batteries.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the carbonaceous material and PTFE mixed with a high energy density metal disclosed by Dansui et al. into the second sheet of Klein et al. to enhance the structure of the electrode and enhance overall battery capacity and performance.

Art Unit: 1725

9. Claims 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Dansui et al. (US 6,033,805) and Ovshinsky et al. (US 2002/0064709) as applied to claim 38 above and further in view of Bando et al. (US 5,965,295).

Regarding claims 45, 46, Klein et al. discloses all of the claim limitations as set forth above and also discloses the hydrogen storage material is a metal hydride ([0043]) selected from the group consisting of AB₅ ([0043]), AB₂ ([0043]), but does not explicitly disclose A is a Group IIb metal, transition metal, rare-earth metal, or metal of the actinide series, and B is a metal of the transition series, nor that the AB₅ has hexagonal or orthorhombic structure and is LaNi₅ or MnNi₅ where Mm is a combination of La and other rare-earth elements.

Bando et al. discloses an electrode (ref 4) comprises hydrogen storage material (C7/L32-35) that is LaNi₅ or NiMn₅ type (C7/L32-33). This configuration enhances over-discharge (C2/L31-32), capacity (C2/L25), charge/discharge cycles (C2/L25-27), and enhanced tensile strength (C2/L40-41).

Bando and Klein are analogous since both deal in the same field of endeavor, namely, batteries.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the LaNi₅ or NiMn₅ type of Bando et al. into the material of Klein to enhance over-discharge, capacity, cycling and tensile strength of the electrode incorporating the material.

Art Unit: 1725

10. Claim 66 is rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Ovshinsky et al. (US 2002/0064709) as applied to claim 61 above and further in view of Bando et al. (US 5,965,295).

Regarding claim 66, Klein et al. discloses all of the claim limitations as set forth above and also discloses the hydrogen storage material is a metal hydride ([0043]) selected from the group consisting of AB₅ ([0043]), AB₂ ([0043]), but does not explicitly disclose A is a Group IIb metal, transition metal, rare-earth metal, or metal of the actinide series, and B is a metal of the transition series, nor that the AB₅ has hexagonal or orthorhombic structure and is LaNi₅ or MnNi₅ where Mm is a combination of La and other rare-earth elements.

Bando et al. discloses an electrode (ref 4) comprises hydrogen storage material (C7/L32-35) that is LaNi₅ or NiMn₅ type (C7/L32-33). This configuration enhances over-discharge (C2/L31-32), capacity (C2/L25), charge/discharge cycles (C2/L25-27), and enhanced tensile strength (C2/L40-41).

Bando and Klein are analogous since both deal in the same field of endeavor, namely, batteries.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the LaNi₅ or NiMn₅ type of Bando et al. into the material of Klein to enhance over-discharge, capacity, cycling and tensile strength of the electrode incorporating the material.

Art Unit: 1725

11. Claims 57-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Dansui et al. (US 6,033,805) and Ovshinsky et al. (US 2002/0064709) as applied to claim 38 above and further in view of Hampden-Smith et al. (US 2003/0054218).

Regarding claim 57, Klein et al. disclose all of the claim limitations as set forth above but does not disclose a separator disposed between layers 2 and 7.

Hampden-Smith discloses a battery ([0318]) containing a Zn metal layer ([0318]) and a metal hydride layer ([0318]) separated by a separator ([0320]). Since the instant specification is silent to unexpected result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange a layered electrochemical structure of Klein et al. to have a separator between metal and metal hydride layers, as taught by Hampden-Smith et al., because selecting one of known designs for an electrochemical cell would have been considered obvious to one of ordinary skill in the art at the time of the invention and because said electrochemical cell defining a metal layer and metal hydride layer separated by a separator would operate equally well as the one disclosed by Klein et al.

Regarding claim 58, Klein et al. discloses all of the claim limitations as set forth above and also discloses an energy carrier layer comprising one sheet (ref 7); a hydrogen absorption layer comprising the other sheet (ref 2); and a mechanical support (ref 4). While reference does not disclose said first and second sheets containing an energy carrier layer and hydrogen absorption layer respectively, it would have been

Art Unit: 1725

obvious to one having ordinary skill in the art at the time the invention was made to reverse the configuration of said sheets, by incorporating the energy material into the first sheet and the hydrogen absorption material into the second, since it has been held that rearranging parts of an invention involves only routine skill in the art while the device having the claimed dimensions would not perform differently than the prior art device, *In re Japikse*, 86 USPQ 70 and since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art, *In re Einstein*, 8 USPQ 167.

Klein et al. does not disclose the electrocatalyst is disposed in a catalyst layer.

Hampden-Smith et. al discloses a battery ([0320]) that contains a catalyst layer ([0320]) to catalyze an electrochemical reaction within the battery to produce power ([0012]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the catalyst layer of Hampden-Smith et al. into the structure of Klein et al. to catalyze the electrochemical reaction to enhance the power performance of the electrochemical cell.

12. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Dansui et al. (US 6,033,805) and Ovshinsky et al. (US 2002/0064709) as applied to claim 38 above and further in view of Bauerline (US 2002/0042000).

Regarding claims 56 and 73, Klein et al. discloses all of the claim limitations as set forth above but does not disclose the first and second sheets are coupled together by a resistor.

Bauerline discloses a Ni/metal hydride cell (Abstract) that is coupled to a resistor ([0027]) to reduce/stop charging and allow for charge storage ([0027]).

Bauerline and Klein et al. are analogous since both deal in the same field of endeavor, namely, batteries.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the resistor of Bauerline into the structure of Klein et al. to reduce/stop charging and allow for a definite charge quantity to be stored.

13. Claim 73 is rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Ovshinsky et al. (US 2002/0064709) as applied to claim 61 above and further in view of Bauerline (US 2002/0042000).

Regarding claims 56 and 73, Klein et al. discloses all of the claim limitations as set forth above but does not disclose the first and second sheets are coupled together by a resistor.

Bauerline discloses a Ni/metal hydride cell (Abstract) that is coupled to a resistor ([0027]) to reduce/stop charging and allow for charge storage ([0027]).

Bauerline and Klein et al. are analogous since both deal in the same field of endeavor, namely, batteries.

Art Unit: 1725

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the resistor of Bauerline into the structure of Klein et al. to reduce/stop charging and allow for a definite charge quantity to be stored.

14. Claim 74 is rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (US 2003/0013015) in view of Ovshinsky et al. (US 2002/0064709) as applied to claim 61 above and further in view of Hampden-Smith et al. (US 2003/0054218).

Regarding claim 74, Klein et al. disclose all of the claim limitations as set forth above but does not disclose a separator disposed between layers 2 and 7.

Hampden-Smith discloses a battery ([0318]) containing a Zn metal layer ([0318]) and a metal hydride layer ([0318]) separated by a separator ([0320]). Since the instant specification is silent to unexpected result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange a layered electrochemical structure of Klein et al. to have a separator between metal and metal hydride layers, as taught by Hampden-Smith et al., because selecting one of known designs for an electrochemical cell would have been considered obvious to one of ordinary skill in the art at the time of the invention and because said electrochemical cell defining a metal layer and metal hydride layer separated by a separator would operate equally well as the one disclosed by Klein et al.

Response to Arguments

15. Applicant's arguments filed 3/5/2012 have been fully considered but they are not persuasive.

Applicant argues Klein et al. does not disclose a high energy density metal that is configured to act as a hydrogen source for [a] hydrogen storage material on reaction with electrolyte in the cell, rather, that in Klein et al., the high energy density metal is only discussed with regard to its conductive properties. However, Klein et al. discloses the metal layer (ref 7) comprises aluminum ([0049]), and further that the metal layers, electrodes, and electrolyte are all sealed such that electrolyte is allowed to contact the metal layer (see [0025], [0053]). It is known that when Al contacts an alkaline electrolyte, hydrogen is evolved as evidenced by Bernard et al., "Understanding aluminum behavior in aqueous alkaline solution using coupled techniques: Part I. Rotating ring-disk study" and further evidenced by Tang et al., "The effect of zinc on the aluminum anode of the aluminum-air battery". Further, where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). Thus, it is the Examiner's position that the aluminum metal and alkaline electrolyte of Klein et al. will inherently evolve hydrogen and thus the rejection with respect to Klein et al. is proper.

Conclusion

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KENNETH DOUYETTE whose telephone number is (571)270-1212. The examiner can normally be reached on Monday - Thursday 6am - 4:30pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on (571) 272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1725

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KENNETH DOUYETTE/
Examiner, Art Unit 1725

/Jonathan Crepeau/
Primary Examiner, Art Unit 1725